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# Assessing the Accuracy of Manipulation Checks: Follow-up.

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RUNNING HEAD: MANIPULATION CHECK FOLLOW-UP

Assessing the Accuracy of Manipulation Checks: Follow-up

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Thesis submitted in partial requirement of the University Honors Program & Honors-In-

Discipline Psychology Program

East Tennessee State University

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Travis Daryl Clark

## Manipulation Check Follow-up

### Abstract

This study examines the accuracy with which participants complete a typical social psychology post-experimental inquiry following a procedure involving deception. Participants were randomly assigned to be informed or naïve to an ostensible purpose and were randomly assigned to be offered or not offered a reward for revealing awareness of the ostensible purpose and admission of receiving prior information. MANOVA analyses suggest that being informed and being offered a reward increase Awareness. Being offered a Reward actually decreased Admission. The implications of these results for deception research will be discussed.

## Introduction

Starting as early as 1925, deception has been used in psychology research and is particularly common in social psychology to this day (Nicks, Korn, and Mainieri, 1997). This can be contrasted with research in economics in which deception is deliberately proscribed (Ortmann and Hertwig, 2002). In the last decade there has been a resurgence of the debate on whether deception is a worthwhile tool for use in psychology and economics research. On one side are economists and psychologists condemning deception for contaminating a shared pool of study participants while some maintain that deception is empirically justified (Jamison, Karlan, and Schechter, 2008). This paper introduces and discusses topics related to deception's use in experiments. Evidence will then be presented from the current experiment in which deception's external validity as a research technique is examined. These results are discussed in the context of other problems in deception research.

### *Why is Deception used in research?*

Deception is defined in several different ways. A general definition, consistent with its use in this document, is information intentionally provided to mislead participants about aspects of a study (from Adair, Dushenko, and Lindsay, 1985). In order for deception to be used in research, four assumptions must be made: participants are naïve to the study design, the research design holds no clues to the hypothesis, the effectiveness of the deception can be validated, and level of suspicion does not alter the results (Golding & Lichtenstein, 1970). Deception should only be used when there are no alternatives that would produce the same results, when the cost of deceiving is outweighed by the scientific benefit of the study, and when participants are given the truth as soon as possible (Goodwin, 2010).

### *Is Deception ever justified?*

## Manipulation Check Follow-up

The question of deception's justification has ethical and practical dimensions. Its ethical implications cannot be examined empirically, but its practical implications have. Participating in an experiment involving deception increases participant suspicion for up to three months (Epley and Huff, 1998). This effect reported by Epley & Huff (1998) did not spread to non-participants, failing to lend support to the shared-resource model proposed by some.

Although strict guidelines are now in place regarding the implementation of deception research, evidence shows that students may not be overly concerned with experimenter honesty (Epstein, Suedfeld, and Silverstein, 1973). Anecdotally, the author and colleagues are often told by participants that participation in experiments is interesting, even fun, but participants rarely report feeling uncomfortable.

### *Confounds in experiments with deception: Crosstalk and Participant reactions to being deceived*

Social psychology, by its very nature, examines participant traits that can be influenced by minute details of the human or object environment. Procedures such as informed consent and debriefing may produce sample bias. Studies have manipulated level of information provided in informed consent documents. Participants who received consent forms fully explaining a conditioning effect did not show the effect, but participants who received consent forms without the explanation did show the traditional conditioning effect (for a full review of these effects see Adair, Dushenko, and Lindsay, 1985). In another series of experiments, the same procedure was performed before and after the requirement of administering consent forms. The same experiment with a consent form failed to find a negative aftereffect of noise phenomenon previously reported (Gardner, 1978). These results imply that any level of informed consent may violate an assumption of deception research, that suspiciousness will not affect participants.

## Manipulation Check Follow-up

The focus of this paper is on confounds in deception research, but crosstalk can cast serious doubt on the results of any study type sensitive to previous information. When one participant, after completing a research study, explains key elements of this study to a future participant, crosstalk has occurred (Edlund, Sagarin, Skowronski, Johnson, & Kutter, 2009). Crosstalk violates one of the assumptions of a deception experiment, that participants will be naïve to the study design.

Edlund and colleagues (2009) devised a method to measure rates of crosstalk in an undergraduate subject pool. A simple bean-counting task was created and, based on upper-level undergraduate guesses, a *false* correct guess created. The experiment, allowing undergraduates to guess the number of beans in the jar, was then repeated while the false correct number (over two thousand short of the actual number) was given to participants as part of the debriefing. Whereas in pretesting only 1 in 3,991 guesses fell within 25 beans of the correct number, by the end of a semester of true testing 2.8% (23 out of 809) showed clear evidence of crosstalk (Edlund et al, 2009).

Lichtenstein (1973) examined crosstalk directly by confederate interviewing. In this study, participants experienced a deception procedure and were subsequently contacted through various means by a confederate. Of participants contacted by phone, 15 out of 19 disclosed critical information. Of participants interviewed in person, 6 out of 28 disclosed critical information; none admitted information (0 out of 8) when explicitly told by the confederate that she would be participating in the same study “tomorrow.”

### *Unique participant pool*

The participants involved in psychology research are often undergraduate students, leading to what has been called the “college sophomore problem.” In one well-known journal,

## Manipulation Check Follow-up

*Journal of Personality and Social Psychology*, the percentage of studies involving college students may in any given year be 70% or higher (Sears, 1986). These students are often psychology majors or minors, adding to this problem. Undergraduate psychology students may, in fact, so strongly expect to be deceived that they disbelieve the true information they receive about an experiment (see Gallo, Smith, and Mumford, 1973).

The beliefs experimenters have about the effect participating in deception research will have on participants has caused some schools to divide participant pools into entirely different categories, those that are naïve and those that have previously participated in deception research (Jamison, Karlan, & Schechter, 2008). In the aforementioned study by Jamison et al (2008), it was discovered that deceived females were significantly less likely to return for a subsequent experiment while males were significantly more likely to return. They also found evidence that deceived participants in a negative condition may be less likely to return than non-deceived participants in the same negative condition. The authors also point out the tricky methodological question of delineating between participant selection effects (did those deceived choose not to return to subsequent experiments?) from double deception effects (did those deceived in two consecutive experiments behave differently as a result?).

### *Do post-experimental inquiries (Manipulation Checks) work?*

Evidence from several previous studies suggests that participants do not reveal awareness of study protocol, even when it is explicitly given to them (Lichtenstein, 1970; Golding & Lichtenstein, 1970; Taylor & Sheppard, 1970). Further complicating the issue is a phenomenon in which participants display the same results in both informed and naïve conditions (Golding & Lichtenstein, 1970; Brown, Blackhart, Roarke, and Pierce, 2011). If participants naïve to the

## Manipulation Check Follow-up

study hypothesis behave the same as those aware of it, this violates one of the basic assumptions of deception research.

Golding and Lichtenstein (1970), in perhaps the first experiment using confederates revealing information about a study, used a fake heart-rate procedure in their study design. Confederates revealed three levels of awareness, Naïve, Suspicious, and Informed. Participants did not significantly differ across these conditions on level of awareness of the study design or admission of receiving previous information. The experimenters also experimentally examined the difference between stressing scientific integrity and stressing that the experimenter needed data quickly for a doctoral thesis. This experiment did find that those in the scientific integrity condition revealed more awareness and admission.

Gallo, Smith, and Mumford (1973) used a typical conformity-study design with three levels of information: typical conformity-design (no information/cover story), minimal information, and complete information. The information was provided by the experimenters as part of the research design. Conformity on the fake line-distance task was not affected by level of information provided; only five subjects, out of one-hundred twenty-eight, revealed that they believed the “responses” by other participants were fake. These five participants were in the partial (2) or complete (3) disclosure conditions. These numbers are distressingly low.

Taylor and Sheppard (1996) fortuitously came across a situation that unfortunately revealed a 0% admission rate. During an experiment that involved false feedback, a participant cancellation lead to a graduate student standing in. During the experiment, at one point eight participants (this time, seven participants and a confederate) were left alone by the experimenter. The confederate listened as the real participants started discussing their feedback—which they were explicitly told not to do—and in this way uncovered the research design. In a post-



## Manipulation Check Follow-up

experimental inquiry, only one of the participants left *any* hint that this had occurred—but none fully disclosed awareness of the manipulation.

Previous research in the Self & Relationships Lab (Brown, et al, 2011) replicates study designs last used decades ago to test manipulation check accuracy. As deception research has become accepted and commonplace since its explosion in the 1960s and 1970s, this study was used to determine whether participants' reactions would be different in a contemporary study. In this study, four independent variables were examined: first, Informed/Naïve, with those in the Informed condition reporting greater awareness of research design and admission of receiving previous information. Second, a Success/Failure mood manipulation was used but found no differences. Third, the manipulation check was administered either on computer or as a face-to-face interview, finding that those in the computer condition reported more admission and awareness. Last, participants were randomly assigned to be offered a reward or not. Those offered a reward scored significantly higher on admission and awareness. The total admission and awareness scores, although manipulated by three of the variables, were still as low as scores (scored in a similar, but not identical fashion) reported by Golding & Lichtenstein (1970).

### *The present study*

Empirical investigation suggests that the manipulation check procedure is not an accurate representation of the amount of information subjects actually know about an experiment. This is a critical flaw considering the differences found in participants that know even minute details of a study. The present study seeks to contribute to the literature by exploring different techniques that are hypothesized to increase the accuracy of our manipulation check. Our first hypothesis is that participants informed of critical elements in our deceptive procedure will admit to having more awareness of our experimental procedure and will admit to having received prior

## Manipulation Check Follow-up

information about the procedure than participants naïve to the deception. Our second hypothesis is that participants offered a reward of one extra research credit will admit to having more awareness of the experimental procedure and will have higher rates of admission to having received prior information than those that do not receive extra research credit.

This study is an improvement in several ways. First, the study design is an improved successor to a procedure used in the Self & Relationships Lab (Brown et al, 2011). In previous studies, one limitation authors often mention is whether participants fully attend to information given about the experiment by experimenters or by confederates. In this study design, participants were brought into the lab and removed from their electronic devices, homework, etc in order to ensure they pay full attention to the manipulation. In addition, our manipulation check itself was in this experiment preceded by a very strong prompt emphasizing scientific integrity. Additional changes from our previous design include the elimination of the computer/face-to-face interview conditions; we instead strictly use computer-based manipulation checks, as they were shown to have higher response scores. Our reward type is also different. Previously, a \$5 gift certificate was offered. In the present study, we are instead offering an extra research credit point. This reward is more immediate, since the gift certificate was awarded at the end of the semester. The extra research credit may provide a better incentive, since research credits are required by our psychology department.

## Method

### *Participants:*

One-hundred thirty nine students completed the study (102 female, 37 male). The age range was 18-48 years ( $M=21.91$ ,  $SD=6.31$ ). Participants were all enrolled in introductory psychology courses and scheduled experiments via an online system to receive course credit.

## Manipulation Check Follow-up

*Materials and Procedure:*

Participants, upon arrival at the lab, seated themselves at a waiting area outside of the lab. Experimental confederates, ostensibly other participants, seated themselves in the same area five to ten minutes prior to the participant's scheduled arrival. At the participant's scheduled time, an experimenter led both into the lab. Both were asked to turn off electronic devices and place all belongings on a designated table; then, both were seated at adjacent desks. Participants and confederates were given consent forms and told to read them while the experimenter exited the room and shut the door ostensibly to prepare two experimental procedures.

While the experimenter was out of the room, confederates introduced the first independent variable condition, Naïve or Informed. For the Naïve condition, confederates initiated a conversation with participants while the experimenter was out of the room. For the Informed condition, the confederates initiated a conversation but asked participants what study they were in the lab to complete. Confederates would then say:

*"Oh, I did that study a couple of weeks ago. They have you fill out a personality questionnaire, and then they give you a fake personality profile. It's all just a trick used to manipulate your feelings."*

After a few minutes, the experimenter would return to the room, giving a light knock on the door to avoid the possibility of discovering whether the participant was Naïve or Informed. Experimenters asked confederates if they had any questions about their consent form. Confederates would say they needed more time to read their consent form as a signal to the experimenter they had not yet been able to initiate a conversation, or confederates would say they are ready to start the experiment as a signal the conversation had taken place. Experimenters first led confederates out of the room, took a moment to ostensibly begin their procedure, and

### Manipulation Check Follow-up

then led participants out in the same manner to a separate room in which the rest of the experiment took place.

Once in the experiment room, participants were seated at a desk with a computer at which all subsequent tasks took place. For this experiment survey software, Limesurvey, was used. All surveys were separated onto distinct pages; further, all surveys with time-sensitive information (e.g., the manipulation check) were preceded by a page with the instructions “STOP! DO NOT CONTINUE UNTIL THE EXPERIMENT HAS RETURNED.” During the normal course of the experiment, participants would not see this page unless they moved forward against the explicit instructions of the experimenter. In addition, a question at the bottom of each survey had to be answered with “The experimenter has returned” to allow movement to the next survey page.

Once a participant entered the room they were given these instructions:

*"This first survey is a personality inventory. This survey provides us with information about your personality. After you complete the survey, we will give you some information on what it says about your personality. Be sure to ONLY complete this survey, and do NOT proceed to the next page. Please inform me when you have completed the survey by using the noise maker."*

The first survey was labeled as “Personality Inventory” and was the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975).

Once participants alerted the experimenter they were finished with the EPQ, the experimenter ostensibly submitted the survey and exited the room to calculate a personality score. In reality, experimenters only calculated scores for the Extraversion subscale.

Experimenters used this information in the next step, tailoring a prompt for low extraversion

### Manipulation Check Follow-up

(score of 0-6) or high extraversion (7-12). After waiting a moment, experimenters entered the room again and read one of two prompts, based on the participant's extraversion score.

Low extraversion (Introverted): "Based on your answers on the personality inventory, we have fit you into one of several personality descriptions. The personality inventory shows that you are more introverted. This means that you're more withdrawn and less sociable, are less comfortable meeting people, prefer to spend time alone or in small groups, etc. Being an introvert is not really a good thing for relationships. Once you get out of college, it's harder to meet people, so it's easier if you score really high on extraversion. If you don't it makes it more difficult to meet people. In fact, research has shown that you're the type of person who will end up alone later in life. You may have friends and relationships now, but by your mid-20s most of these will have drifted away. You may even marry or have several marriages, but these are likely to be short-lived and not continue into your 30s. Relationships don't last, and when you're past the age where people are constantly forming new relationships, the odds are you'll end up being alone more and more."

High extraversion (Extraverted): "Based on your answers on the personality inventory, we have fit you into one of several personality descriptions. The personality inventory shows that you are more extraverted. This means that you're outgoing and sociable, are comfortable meeting people, like to go to parties, etc. Being extraverted is a good thing for meeting people, especially when you're in college, but there's been some research that's shown that people who score high on extraversion have trouble keeping relationships together later in life. That is, research has shown that you're the type of person who will end up alone later in life. You may have friends and relationships now,

## Manipulation Check Follow-up

but by your mid-20s most of these will have drifted away. You may even marry or have several marriages, but these are likely to be short-lived and not continue into your 30s.

Relationships don't last, and when you're past the age where people are constantly forming new relationships, the odds are you'll end up being alone more and more."

Once this feedback was provided, participants were told to complete a mood scale (Buckley, Winkel, & Leary, 2004). The mood scale consisted of thirty items designed to assess Belonging, Depressed Mood, Hurt Feelings, Positive Emotion, Anger, Anxious Emotion, and Self-conscious Emotion. This was followed by a Demographics form. Once participants completed these two tasks, instructions were given for a Writing Task.

"Please write an essay taking a clear pro or con stance on the Tobacco Policy of ETSU [East Tennessee State University]. The policy states 'ETSU is a Tobacco-Free Campus, with smoking and all other tobacco usage permitted only in private vehicles. This policy applies to all university buildings/grounds; ETSU-affiliated off-campus locations and clinics; any buildings owned, leased or rented by ETSU in all other areas; and ETSU facilities located on the campus of the James H. Quillen Veterans Affairs Medical Center at Mountain Home. Tobacco use is also prohibited in all state vehicles. This tobacco-free policy is in effect 24 hours a day year-round.' You will have 10 minutes to complete the essay."

Once the entire ten minutes elapsed, participants were informed to move on to the next task. The next task was our first Manipulation Check (see Appendix). Participants were told (script adapted from Golding & Lichtenstein, 1970):

"We would like your feedback about the design of the study. We want to make sure that our experimental design is sound, and we need your feedback to help us improve this

### Manipulation Check Follow-up

study. In addition, we want to know whether anything odd or irregular happened as you participated in the study today. These things sometimes happen, and as long as we know about them, we can correct for them, and make sure that our findings are valid and reliable. It is therefore extremely important for the scientific validity of the study that you tell us if anything like this happened today. Please be as honest as possible in your answers; no feedback we receive, including negative feedback, will result in a loss of research credit, nor will it affect how we use your data. In fact, negative feedback is an important way for us to improve upon our design for future studies. Be as detailed as you feel is necessary to fully answer each question. You may spend as much time on these questions as you want, but we ask that you spend a minimum of 5 minutes answering these questions.”

At this time, the second independent variable condition was applied to participants. Those in the “No Reward” condition were only given the above prompt. Those in the “Reward” condition were given an additional message:

“You should also know that for this study, we are giving any participants that correctly state the purpose of this study one extra Sona research credit.”

Once the minimum five minutes elapsed and participants indicated they were finished with the Manipulation Check, they moved on to the Debriefing. Experimenters read the debriefing aloud, prompting for any questions. The debriefing for the study included a full explanation of the confederate’s role and the purpose of the Manipulation Check. After the debriefing, participants were given a second manipulation check (see Appendix).

## Results

### *Awareness and Admission scores*

### Manipulation Check Follow-up

Awareness of study design and Admission of receiving previous information were both scored on a 1 to 5 scale by two independent raters; disagreements were settled by a third independent rater. For both scales, a score of 1 signifies complete lack of information or no response. For Awareness, a score of 3 indicates suspiciousness about the study design without any particular knowledge of that design; a score of 5 indicates full knowledge of the ostensible hypothesis, that the personality feedback was used to manipulate mood. For Admission, a score of 3 represents admission of having talked about the study with someone else without mentioning any compromising information that was discussed; a score of 5 indicates that another person shared critical details of the study with the participant. Pre-debriefing Awareness had an overall mean of 2.99 (SD=1.64) and Admission a mean of 1.44 (SD=1.07). Out of the total 139, 70 were Naive and 69 were Informed; 70 were in the No Reward condition and 69 in the Reward condition.

### *Interrater Reliability:*

Interrater reliability was calculated using Cronbach's  $\alpha$ . For Awareness, Cronbach's  $\alpha=0.96$  and for Admission Cronbach's  $\alpha=0.95$ . These  $\alpha$  levels indicate a reliable rating technique (for Rating Scales, see Table 1).

### *Correlations and ANOVA:*

Awareness was significantly negatively correlated to positive emotions ( $r=-.22$ ,  $p<.01$ ) and Admission was significantly positively correlated to self-conscious emotion ( $r=.27$ ,  $p<.01$ ). Admission was less strongly correlated with anger and anxiety ( $r=.18$ ,  $r=.18$ ,  $p<.05$ ). Awareness and Admission were not significantly correlated with each other ( $r=.08$ ). For a full list of all correlations between Belonging, Depressed Mood, Hurt Feelings, Positive Emotions, Anger, Anxiety, Self-conscious emotions, Awareness, and Admission, see Table 2.



### Manipulation Check Follow-up

A 2 X 2 (Naïve/Informed X No Reward/Reward) MANOVA found main effects for both dependent variables. Those in the Informed group had higher Admission ( $F(1, 135)=19.51$ ,  $p<.01$ ) and Awareness ( $F(1,135)=7.25$ ,  $p<.01$ ) than those in the Naïve group. Those in the Reward conditions had higher Awareness ( $F(1, 135)=5.63$ ,  $p<.05$ ) as well than those in the No Reward group. Contrary to our hypothesis, those in the Reward condition reported less Admission ( $F(1, 135)=6.01$ ,  $p<.05$ ) than those in the No Reward group (see Table 3 for a full list of F scores, Means, Standard Deviations, and D values). The interaction between our two independent variables was marginally significant, indicating that participants in the Informed/Reward condition reported less Admission ( $F(1, 135)=3.75$ ,  $p=.055$ ; see Figure 1) than those in the other three conditions.

Some of the mood scale items were weakly correlated to Admission and Awareness, so they were entered as covariates in MANCOVA analysis. These mood items generally did not alter the MANOVA results, but with self-conscious emotion entered as a covariate its effect on Admission was significant ( $F(1, 134)=11.99$ ,  $p<.01$ ), higher self-conscious emotion relating to higher Admission.

### Discussion

An outstanding result of this study is that our Admission and Awareness scores were extremely low. In this study, the mean Admission and Awareness were 1.44 and 2.99, respectively. In total, only 36 students (out of 69) in the Informed condition were rated as a 4 or 5 on Awareness; 10 (out of 69) were rated as 4 or 5 on Admission. A score of 4 or 5 on either of these scales indicates awareness of the study design exceeding the basic assumptions of an

### Manipulation Check Follow-up

experiment involving deception. Based on previous research, it would be safe for researchers using deception to assume that this level of awareness of the study design may seriously compromise the procedure's validity. Nearly half of participants with compromising information about the study did *not* reveal that information.

Participants in the Informed condition responded in line with expectations by revealing significantly more Admission of receiving previous information and Awareness of the study design than participants in the Naïve condition. This supports our first hypothesis. Compared to previous research conducted by Brown et al. (2011), mean Admission was about the same ( $M=1.44$ ; previously  $M=1.22$ ,  $SD=.71$ ) and Awareness was increased in the present study ( $M=2.99$ ; previously  $M=1.78$ ,  $SD=1.13$ ; for full details see Brown et al., 2011). Awareness and admission scores for informed participants were, however, still lower than what the author had hoped to find.

The effect of the Reward condition was more complicated. Although being offered an extra credit incentive increased reported Awareness for informed participants, being offered a Reward actually lead to decreased Admission of having received prior information. This effect is inconsistent with Brown, et al (2011), in which Reward raised Admission rates. There are several changes to our experimental design that may have lead to this effect.

One explanation is that participants, despite being repeatedly reminded that their answers would not lead to negative consequences, feared punishment to themselves or other participants (the Confederate). Participants were more comfortable revealing awareness of the study design perhaps because it could be argued that they learned the study design during participation in the experiment. This is a legitimate method of gaining awareness of a typical study. Admission of receiving previous information, in contrast, implies that wrong-doing has taken place by both the

### Manipulation Check Follow-up

Confederate (who should not have revealed information) and the participant (who should have withdrawn from the experiment, or alerted the experimenter). We strengthened our scientific integrity prompts hoping to increase Admission, but the aspect of guilt may have worked counter to our intentions.

The Reward extra credit point shifted participants' reasons for revealing information from an internal source (scientific integrity, conscience) to an external source (expectation of reward). Conscience may have led to greater Admission than monetary incentive. This explanation assumes that changing reward type—from a \$5 gift certificate to an extra credit point—changes participants' views of the reward.

### *Limitations and Future research*

The aim of this line of research is primarily to identify factors that increase participant honesty. Thus far, evidence shows that computer-based post-experimental inquiries increase it, mood manipulation does not affect it, and offering a reward has an effect on it. While this study improved upon Brown et al. (2011), it does not offer a perfect solution. Admission and Awareness rates were still low, indicating that our strong scientific integrity prompt, the change of reward, the newly introduced post-experimental inquiry time requirement, and the procedure changes to make sure participants attended to the Informed condition prompt all failed to lead to honesty. While many of these factors merely failed to increase awareness and admission, one factor in particular may have actually decreased it.

Though the offering of a reward for participant honesty may intuitively be a simple way to increase admission and awareness rates, the author cautions against its use. Evidence in the first study for a reward's use is contraindicated in the second study. The clearest distinction between the two studies is the type of reward used. In the first, the reward was monetary and

### Manipulation Check Follow-up

foreign to typical participant expectations. In the second study, the reward was an extra credit point; at this institution, nearly all studies offer SONA system points for completion of an experiment. The extra SONA point changed the study's worth from 3 to 4 credits, still not an unusual amount for any given study. While in neither instance should participants have known about the reward, in the second study it may have been less unexpected. Perhaps the appropriate type of reward has yet to be experimentally tested; perhaps offering any type of reward irreparably damages experimental realism. These claims are both equally plausible and untested.

The question of participant honesty has received little attention in the last few decades in relation to the volume of deceptive studies published. Is it because no research has been successful in increasing participant honesty, or is it because no experimental manipulation *can* increase participant honesty?

### *Conclusion*

The present study updates the literature on manipulation check accuracy by providing a test of procedures developed over the last four decades on a sample typical of psychology studies in the 21<sup>st</sup> century, not the 1970s. Deception in research is a widely used and accepted practice in contemporary experimental psychology. Psychology department protocols, participant pools, and experimental procedures are continually evolving. That manipulation check accuracy is as low now as the lowest predictions from the 1970s in light of these changes is alarming. That manipulation check accuracy is only trivially improved by our procedure changes is alarming.

The use of deception in experimental design will not cease, but precautions must be in place to assure participant honesty. Our research and the previous literature suggest that experimenters should assess participant awareness in every study involving deception. An anonymous form stressing scientific integrity administered before the debriefing in the

### Manipulation Check Follow-up

experiment is the best evidence-based procedure found thus far to assess participant awareness.

Rewards for participant honesty wildly varied in their effect. Rewards should not be used to elicit participant honesty until the effectiveness of different types of rewards has been conclusively established. Finally, the reliance on participant honesty should be minimized. If data can be obtained concerning a phenomenon using two alternative procedures, the procedure with less reliance on the assumptions of deception research is the better alternative.

It has been said that the widespread use of deception in psychology has led to a slowdown of experimental innovation (Ortmann & Hertwig, 2002). If this is truly the case, the hesitation to use deception in a study design may be a positive influence in psychology. Ortmann and Hertwig (2002) describe examples of experimental designs thought impossible without the use of deception recreated without using deception. If psychologists are more hesitant to use deception, perhaps instead the field will see greater innovative techniques. With the reliability of deceptive protocols being empirically explored and called into question, the risk of using deceptive protocols is high. A deceptive protocol may be used and retroactively discredited by explorations into its methodological flaws.

The use of deception in psychological research is a long-standing tradition that is unlikely to change. Empirical findings concerning the internal reliability of participant reactions in deception research, its use must be carefully weighed against its cost. A proscription against deception—such as in economics—would not be welcome in psychology, but a caution against its use may promote experimental innovation. Participant honesty should not be assumed, pending experimental innovation to elicit it with any degree of confidence.

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## Appendix

Manipulation Check presented immediately prior to debriefing with a minimum 5-minute completion time:  
*We would like your feedback about the design of the study. We want to make sure that our experimental design is sound, and we need your feedback to help us improve this study. In addition, we want to know whether anything odd or irregular happened as you participated in the study today. These things sometimes happen, and as long as we know about them, we can correct for them, and make sure that our findings are valid and reliable. It is therefore extremely important for the scientific validity of the study that you tell us if anything like this happened today. Please be as honest as possible in your answers; no feedback we receive, including negative feedback, will result in a loss of research credit, nor will it affect how we use your data. In fact, negative feedback is an important way for us to improve upon our design for future studies. Be as detailed as you feel is necessary to fully answer each question. You may spend as much time on these questions as you want, but we ask that you spend a minimum of 5 minutes answering these questions. [IF REWARD: For this study, we are also offering 1 extra Sona research credit to anyone who correctly states the purpose of the study.]*

**PEIQ1: In your own words, what was the present study about?**

**PEIQ2: Did you believe, at any time, that the experiment dealt with anything other than what the experimenter had described to you? [Yes/No]**

**PEIQ2a: If yes, what?**

**PEIQ3: Did this affect your behavior in any way? [Yes/No]**

**PEIQ3a: If yes, in what way?**

**PEIQ4: Did you feel that certain reactions were expected from you at any time? [Yes/No]**

**PEIQ4a: If yes, what?**

**PEIQ5: Sometimes people may hear something about a study before they participate in that study. Did you have any information about this study before participating, from any source (e.g., from other students, your psychology instructor, psychology textbooks, previous research you have participated in)? [Yes/No]**

**PEIQ5a: If yes, please tell us what information you had before participating in the study (we are not interested in finding out how or from whom that information was obtained).**

**PEIQ6: Did you believe the experiment attempted to manipulate your mood at any point? [Yes/No]**

**PEIQ6a: If yes, in what way?**

**PEIQ7: Did you have any doubts or suspicions about any information given to you prior to your participation or during the study? [Yes/No]**

**PEIQ7a: If yes, please provide more details.**

**PEIQ8: Did your experimenter do anything to cause you to be suspicious? [Yes/No]**

**PEIQ8a: If yes, what?**

**PEIQ9: Sometimes psychology studies include elements of deception. Did you expect to be deceived in this study? [Yes/No]**

**PEIQ9a: If yes, in what way?**

Questions asked immediately following Debriefing:

*As you read in the debriefing, one of the chief goals of this study is to improve experimental design. Participant feedback is an important way to evaluate study designs, and we are grateful for any information and/or comments you provide. The following provides an opportunity for you, the participant, to help us with your feedback.*

**MC1: Do you think there is anything that could be done to improve this study? [Yes/No]**

**MC1a: If yes, what?**

**MC2: Did you, at any time, feel uncomfortable while participating in this study? [Yes/No]**



### Manipulation Check Follow-up

MC2a: If yes, in what way?

MC3: Did you have any information about this study before participating, from any source (e.g., from other students, your psychology instructor, psychology textbooks, previous research you have participated in)?

[Yes/No]

MC3a: If yes, please tell us what information you had before participating in the study (we are not interested in finding out how or from whom that information was obtained).

MC4: It is extremely important that you not tell others students who may participate in this study in the future about the true purpose of this study. Will you commit to not tell others about this study?

[Yes/No]

Table 1

*Rating scales used to code dependent measure Awareness and Admission*

	Awareness of Experimental Manipulation	Admission of Prior Information
1	No awareness or suspiciousness of the experimental deception or purpose of the study indicated and/or no answers given.	No admission of prior information (i.e., denial of previous conversation).
2	General suspiciousness about the purpose of the study indicated, but participant completely unaware of the experimental deception or purpose of the study (e.g., “I don’t know, but psychology studies always try to trick you”; “something seems not right about this study”).	Regurgitation of the general information about the study provided by the researchers (i.e., admission of having received prior information about the study by researcher or on SONA).
3	Suspiciousness about a particular factor in the study indicated (e.g., the personality inventory or writing task may have been something other than what it seemed; “It was weird that they told me I would be alone in life”).	Admission to having discussed the study with someone else (a student, not a lab assistant) but no other information shared.
4	Partial or slightly inaccurate awareness of the experimental deception or purpose of the study indicated (e.g. “This study was not about writing,” “The study gave me wrong information,” “That Personality Inventory feedback was not true”). If answers describe the study as “Fake,” this automatically places it in category 4 or 5.	Admission to being told certain details about study, and sharing those details, without full disclosure (i.e., “Someone told me this study was fake”).
5	Complete awareness of the experimental deception or purpose of the study indicated <b>and/or restating the hypothesis</b> (e.g. “This study was only about manipulating my mood by giving me false feedback.”).	Complete admission to being told about the study and detailing all of the information received and/or admission of being told the hypothesis (“The personality inventory feedback was used to manipulate my mood.”).

## Manipulation Check Follow-up

Table 2

*First-order correlations, Means and Standard deviations for Mood scale scores and Dependent variables*

	1	2	3	4	5	6	7	8	9
1. Awareness	--								
2. Admission	0.078	--							
3. Belonging	-.121	0.029	--						
4. Depressed Mood	0.081	0.159	.188*	--					
5. Hurt Feelings	0.048	0.138	.306**	.811**	--				
6. Positive Emotion	-.219**	-.050	.537**	0.368**	-.250**	--			
7. Anger	0.156	.178*	.350**	.591**	.647**	.207*	--		
8. Anxious Emotions	-.041	.182*	.216*	.530**	.499**	.206*	.546**	--	
9. Self-conscious Emotions	0.024	.271**	.202*	.608**	.649**	-.310	.618**	.606**	--
M	2.99	1.44	12.21	7.64	5.5	16.18	6.99	9.94	6.71
SD	1.64	1.07	2.91	4.42	3.51	5.17	4.24	5.12	4.13

\* $p < .05$

\*\* $p < .01$

Table 3

*Main effects for Informed/Naïve and Reward/No Reward factors on Awareness of the experimental manipulation and Admission of prior information*

	Awareness				Admission			
	F	p	d	M(SD)	F	p	d	M(SD)
Informed/Naïve	7.25	<.01	0.45		19.51	<.01	0.73	
Informed				3.35(1.53)				1.81(1.39)
Naïve				2.63(1.68)				1.07(0.35)
Reward/No Reward	5.63	<.05	0.39		6.01	<.05	0.39	
Reward				3.30(1.61)				1.23(0.83)
No Reward				2.67(1.62)				1.64(1.24)

Figure 1

*Mean Admission of Prior Information subdivided by experimental condition*

